
OSHA
adds value to business,
work and life.

In FY 2009 what was the number ONE cited violation by OSHA in Manufacturing

- Was it
  - Hazard communication
  - Walking and working surfaces
  - Respiratory protection
  - Machine Guarding
  - Power transmission (belts pulleys etc)
  - OR None of these

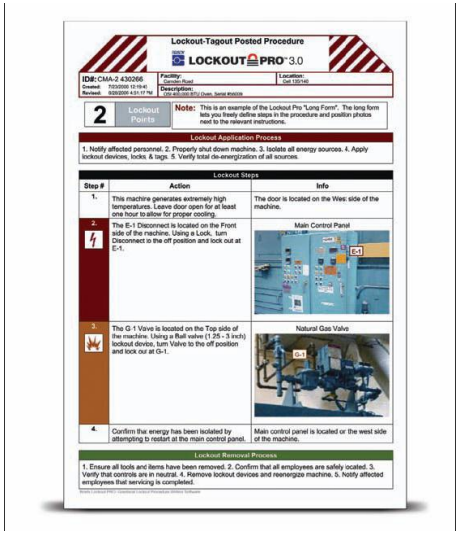
The number one cited standard is

LOCKOUT

19100147
2570 Items
1419 Inspections
$3,051,875

Lockout / Tagout Facts

- Top 5 OSHA LO/TO violations:
  - Failure to establish and implement a written lockout **PROGRAM**
  - Failure to develop, document and utilize **MACHINE-SPECIFIC PROCEDURES**
  - Failure to conduct a **PERIODIC INSPECTION** of the energy control procedure
  - Failure to provide **TRAINING** as described by OSHA
  - Failure to clearly OUTLINE the SCOPE and rules to be utilized, and the means to **ENFORCE** compliance



Machine-Specific Procedures

This information has been developed by an OSHA Compliance Assistance Specialist and is intended to assist employers, workers, and others as they strive to improve workplace health and safety. While we attempt to thoroughly address specific topics, it is not possible to include discussion of everything necessary to ensure a healthy and safe working environment in a presentation of this nature. Thus, this information must be understood as a tool for addressing workplace hazards, rather than an exhaustive statement of an employer's legal obligations, which are defined by statute, regulations, and standards. Likewise, to the extent that this information references practices or procedures that may enhance health or safety, but which are not required by a statute, regulation, or standard, it cannot, and does not, create additional legal obligations. Finally, over time, OSHA may modify rules and interpretations in light of new technology, information, or circumstances; to keep apprised of such developments, or to review information on a wide range of occupational safety and health topics, you can visit OSHA's website at www.osha.gov.

When a search is done for keywords in accident summaries on the OSHA webpage

- Lockout comes up over 4000 times
- It is found in over 700 fatal events

Causes of these events include

- Failure to stop equipment
- Failure to disconnect from power source
- Failure to dissipate (bleed, neutralize) residual energy
- Restarting of equipment
  - (intentional or inadvertent)
- Failure to clear work areas before restarting

Why Lockout / Tagout?

To protect workers

Isolating Hazardous Energy

- **De-energize circuits**
- **Block moving parts**
- **Release pressure**
- **Neutralize extreme temps**
- **Prevent chemical exposure**

OSHA wants you to work safely

- There are online tools that you can utilize at the Occupational Safety and Health Website
  - OSHA.gov

Lockout/Tagout

OSHA

Links to other Web sites with information on LOTO

LOTO HOME

Lockout-Tagout Interactive Training Program

The Directorate of Technical Support presents the 1910.147, **Lockout/Tagout Interactive Training Program**. We developed the program jointly with the Directorates of Enforcement Programs, Safety Standards and Guidance, the Office of Training and Education, and the Office of the Solicitor. Compliance officers in Philadelphia, New York, and Atlanta assisted us as well.

Whether you are a recent hire or an experienced employee, this program will expand your knowledge of the Lockout/Tagout (LOTO) standard.

The program has three major components. You can go through these components at your own pace and in any sequence:

Tutorial: Explains the standard in a question/answer format.

Why Use This Tool?

- ***Includes selected references for training.***
  Includes revised preamble/ standard, compliance directive, selected letters of interpretation and case law.
- ***Quick retrieval of information.***
  Highlights relevant sections of information on screen.
- ***It's "smart."***
  Explore the interactive case studies.

Hot topics: Contains five abstracts with a detailed discussion of major issues. Relevant highlighted sections of the all-inclusive documents are linked here.

Interactive case studies: Seven simulated LOTO inspections are presented. You will be making decisions on the application of the LOTO standard, based on information presented on the screen.

[Link to OSHA Lockout Tagout]

NIOSH Publication No. 99-110:
NIOSH Alert: Preventing Worker Deaths from Uncontrolled Release of Electrical, Mechanical, and Other Types of Hazardous Energy

- Review of these 152 incidents suggests that three related factors contributed to these fatalities:
  - Failure to completely de-energize, isolate, block, and/or dissipate the energy source (82% of the incidents, or 124 of 152)
  - Failure to lockout and tagout energy control devices and isolation points after de-energization (11% of the incidents, or 17 of 152)
  - Failure to verify that the energy source was de-energized before beginning work (7% of the incidents, or 11 of 152)

What is required to comply?

- The same that is necessary to protect employees from uncontrolled energy

1910.147(a)(1) Scope

- (i) This standard covers the servicing and maintenance of machines and equipment in which the "unexpected" energization or start up of the machines or equipment, or release of stored energy could cause injury to employees.

This standard doesn't apply to the

- (A) Construction, agriculture and maritime employment;
- (B) Installations under the exclusive control of electric utilities for the purpose of power generation, transmission and distribution, including related equipment for communication or metering; and
- (C) Exposure to electrical hazards from work on, near, or with conductors or equipment in electric utilization installations, which is covered by Subpart S of this part; and
- (D) Oil and gas well drilling and servicing.

BUT OTHER Standards DO! So control the Hazard

What are the sources of energy that we need to control?

- Chemical
- Thermal
- Gravity
- Radiation
- Electrical
- Mechanical
- Hydraulic
- Pneumatic

1910.147(a)(2)(iii)(A)

- This standard does not apply to the following:

- Work on cord and plug connected electric equipment for which exposure to the hazards of unexpected energization or start up of the equipment is controlled by the unplugging of the equipment from the energy source and by the plug being under the **exclusive control of the employee** performing the servicing or maintenance.

Please note the red text, often people miss it, Exclusive control is control, you may need a loto canister for the plug end.

This does not mean that if you pull the plug it is safe

- You must determine if the hazard is controlled by the unplugging of the equipment.
- If I unplug my portable air compressor, have I removed the potential hazard?
  - **No,** there is still compressed air in the tank
  - And even if I bleed off the pressure, I still need to control the plug so it doesn't get re-energized.
  - One must prevent energization

Control the plug (my old saw almost got me)

Photos courtesy of Brady Corp

1910.147(a)(3)(i)

- This section requires employers to establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, start up or release of stored energy in order to prevent injury to employees.

So what do I need to do?

- Determine whether servicing and maintenance operations are performed by the employees.
- If you have contractors performing maintenance or other activities, do you have any of your people exposed to a hazard that the contractor creates?
- If yes, you need to control the exposure to the hazard

This standard applies to the control of energy during servicing and/or maintenance of machines and equipment.

- Normal production operations (if in complaince with OSHA guarding and other standards) are not covered by this standard. Servicing and/or maintenance which takes place during normal production operations is covered by this standard only if:
  - An employee is required to remove or bypass a guard or other safety device; or
  - An employee is required to place any part of his or her body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger zone exists during a machine operating cycle. (minor tool adjustments)

Affected employee.

- An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized employee.

- A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

There is a third type of employee

- a. The standard recognized three types of employees: (1)"authorized" and (2)"affected", defined in 1910.147 (b), and (3)"other", defined in 1910.147(c)(7)(ii)(C)…Different levels of training are required based upon the respective roles of employees in the control of energy and the knowledge which they must possess to accomplish their tasks safely and to ensure the safety of fellow workers as related to the lockout/tagout procedures

They must be aware.

- All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.
- 1910.147(c)(7)(i)(C)

Energy Control Program Core

- The energy control program has three core components:
  - energy control procedures,
  - employee training, and
  - periodic inspections.

Energy Control Program Core 1

- Energy control procedures detail and document the specific information that an authorized employee must know to accomplish lockout/tagout, namely, the scope, purpose, authorization rules and techniques to be utilized for the control of hazardous energy

Energy Control Program Core 2

- Periodic inspections of the energy control procedures ensure that the procedures and the requirements of the standard are being followed.

Energy Control Program Core 3

- Employee training and retraining, along with additional training under a tagout system, ensures that the purpose and function of the energy control programs are understood…

Procedures

- At a minimum, the procedures must include:

A specific statement of the intended use of the procedure.

Specific procedural steps for shutting down, isolating, blocking, and securing machines or equipment to control hazardous energy.

Specific procedural steps for the placement, removal, and transfer of lockout devices or tagout devices, and a description of who has responsibility for them.

Specific requirements for testing a machine or piece of equipment to determine and verify the effectiveness of lockout devices, tagout devices, and other energy control measures

Do I need to have an individual procedure for each machine?

- NO, machines and/or equipment with the same type and magnitude of hazardous energy and which have the same or similar type of controls can be grouped and inspected by the type of procedure. A grouping of detailed individual procedures would be considered a single procedure for periodic inspection purposes, if all of the procedures in the grouping have the same or similar:
- Intended machine/equipment use;
- Procedural steps for shutting down, isolating, blocking, and securing machines or equipment;
- Procedural steps for the placement, removal, and transfer of the lockout or tagout devices and the responsibility for them; and
- Requirements for testing a machine or equipment to determine and verify the effectiveness of lockout/tagout devices and other control measures.

- **Link to Appendix A**

Typical minimal lockout procedures

Affected and Other

- Each affected employee shall be instructed in the purpose and use of the energy control procedure.
- All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

Your goal should be to avoid anything similar to this recent event

- A qualified electrician, and an unqualified helper were performing repair on a 480 VAC circuit energized.
- When the final circuit conductors were being connected at the control panel, the ground wire was accidentally shorted directly to the phase terminals, and created an arc fault / flash / blast. The released energy struck the electrician full force and caused serious injuries, and subsequent demise. The helper was knocked down, scuffed a bit, and had a temporary loss of hearing, accompanied by a headache.
- The circuit was energized unnecessarily, and no form of personal protective equipment was being used, and no insulating materials / sheilds, or devices were used to protect from such accidental contacts.
- The panel was not appropriately marked for the hazards, nor were other forms of warning present

To start

- Create program and procedures by
- Identifying workers and tasks
- Identifying energy sources
- Identifying control points, and verifying that they do control power (multiple sources)
- Create loto procedure
- Train
- EVALUATE and modify if needed

WHY Periodic Inspections

To ensure that the energy control procedures continue to be implemented properly, that the employees are familiar with their responsibilities, and that any deviations or procedural inadequacies that are observed are corrected

Such as, do they work on electrical equipment energized, do the procedures protect, and do you monitor the changes (new equipment, process redesign etc) in the facility

How Often

- A minimum of an annual evaluation
- An authorized employee not involved in the energy control procedure being periodically inspected .

What does the periodic inspection entail?

- The employer must identify any deficiencies or deviations and correct them.
- Where lockout is used, the inspector must review each authorized employee's responsibilities under the procedure with that employee (group meetings are acceptable).
- Where tagout is used, the inspector must review both the authorized and affected employee's responsibilities with those employees for the energy control procedure being inspected, and the additional training responsibilities of 1910.147(c)(7)(ii)

Documentation

- The employer must certify that the periodic inspections have been performed.
- What must the certification identify?
- Identify machine(s) on which the procedure was utilized.
- Date of inspection

Some annual inspections have found

- Employees are turning off the wrong disconnect. (verification?)
- Multiple sources of power
- Incomplete lockout documentation
- Misunderstandings, “ I need to turn that off also?”
- Software controlled

Why can't I use a programmed e-stop?

- The standard prohibits the use of motor-control-circuit switches and relays as energy isolating devices. Thus, pursuant to the standard, such mechanisms cannot be used to control hazardous energy.
- Section 1910.147(c)(1) requires that before any employee performs servicing or maintenance on a machine or equipment where the unexpected energizing, start-up, or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source, and rendered inoperative. Machines and equipment are isolated from energy sources by *energy isolating devices.*

Training

- The employer shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees.

The training shall include the following:

- Each authorized employee shall receive training in the
- recognition of applicable hazardous energy sources, the
- type and magnitude of the energy available in the workplace, and the
- methods and means necessary for energy isolation and control.

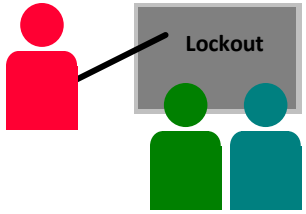
Electrical Panel Lock – Or is it?

Electrical Panel Lock – Or is it?

Use of Hasps

Locked out?

Employee Retraining



Shall be provided for all authorized and affected employees when:

- **Change in job assignments**
- **Change in machines, equipment or processes that present new hazards**
- **Change in energy control procedures**
- **Periodic inspection reveals, or employer has reason to believe, there are deviations in employee knowledge of procedures**

Are Forklifts Covered?

rces?

Energy Isolating Device

Push buttons, selector switches and other control circuit devices are not energy isolating devices

What about live electrical work?

- (2) A copy of the written procedures for locking and tagging required by 29 CFR 1910.147 will also comply with this requirement, provided those procedures address the electrical safety hazards covered by Subpart S and provided the procedures conform to 1910.333 (b).
- (3) If the employer has chosen to utilize procedures developed to comply with 1910.147 for electrical as well as other hazards, the written procedures must include steps corresponding to requirements in Section 1910.333 for application of locks and tags and verification of deenergized conditions (29 CFR 1910.333(b)(2)(iii)(D) and (b)(2)(iv)(B)).

If you work electrical energized

- **Question 2:** Does the employee need to wear full flame-resistant (FR) clothing, head and face protection, and rubber insulating gloves when working on a panel that has been completely de-energized, either disconnecting and locking out the panel itself or by disconnecting and locking out a panel upstream from the panel where the work is being performed?

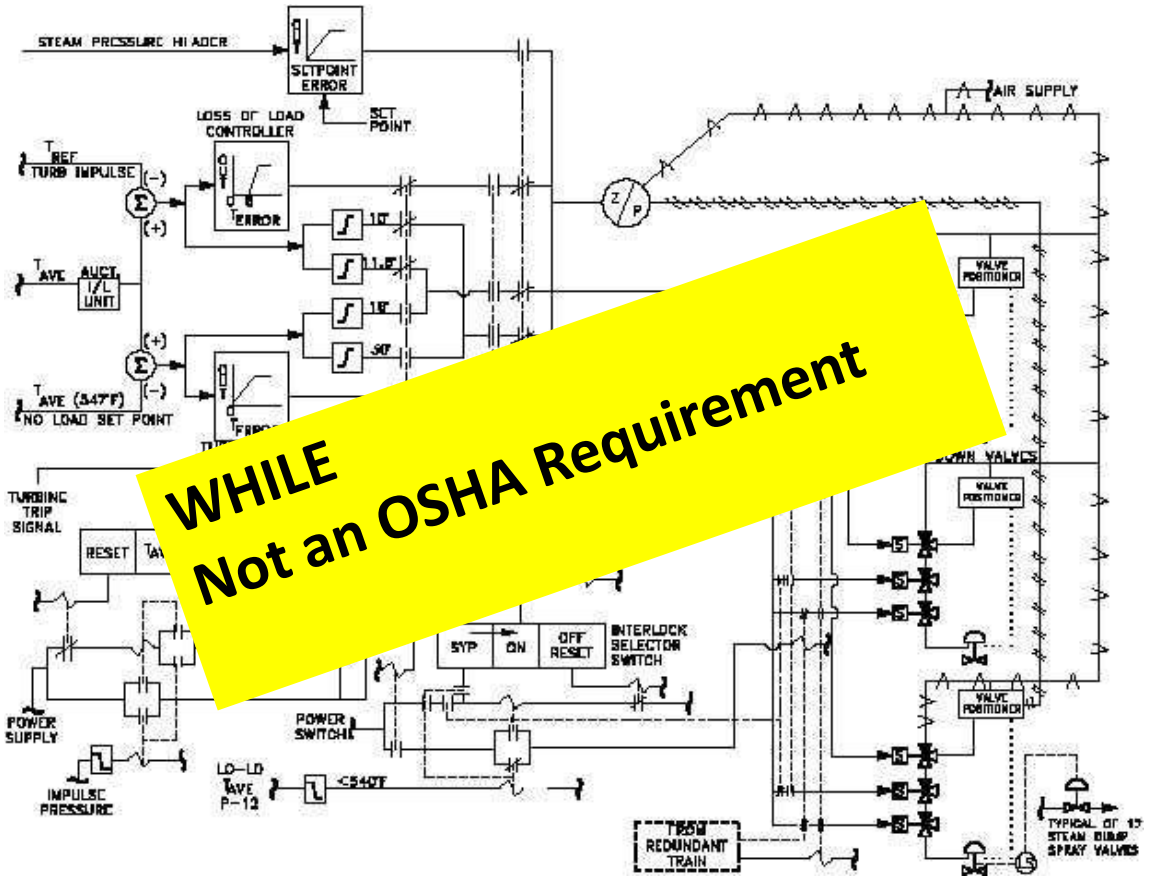
  Answer: No. If there are no exposed energized electrical components *after a person has locked and tagged out the disconnect, **and verified de-energization***, per… §1910.333(b)(2), then there would be no potential for electric shock or arc flash. The protective equipment that you mentioned would not be required.3 However, PPE may be required by another condition.

So if you work energized

- You need to have an Electrical Safe Work Practices program (ESWP)
- You can use NFPA 70E as a guide, OSHA may use it as evidence.
- The practices and procedures can be incorporated into your LOTO progam, but the hazards need to be addressed. Don't assume that your workers aren't exposed to electrical hazards and that they always turn it off. **Verify**
- **Goal 1 is turn it off !**

Line Drawings

Can help maintain coordination of Circuits and Electrical Service



You still need to know where to turn it off and lock it out !!!